This trifling concession to the sanatory interests of the people of Liverpool, obtained through the interest of private parties, was, as we have seen, *formally refused to the public*.

But ventilation cannot be perfect without the influence of the sun's rays, to rarefy the air and produce a current, and we cannot have darkness and gloom without dirt and filth. The sanatory properties of light, apart from the question of ventilation, form another important consideration.

The public are familiar with the fact that light is essential to vegetation—that the fruits of the earth will not ripen without the rays of the sun, and that their influence is sensibly felt in an exhilaration of the animal spirits. But it is now beginning to be understood by medical practitioners, that a deficiency of light is as injurious to the health of animals as it is to the growth of plants, and is a check to the full and perfect development of all organic structures, vegetable or animal. Upon this head some important testimony was given by a distinguished surgeon, Mr. Ward, to the Health of Towns Commissioners.

"Dupuytren (I think) relates the case of a lady whose maladies had baffled the skill of several eminent practitioners. This lady resided in a dark room (into which the sun never shone) in one of the narrow streets of Paris. After a careful examination, Dupuytren was led to refer her complaints to the absence of light, and recommended her removal to a more cheerful situation. This change was followed by the most beneficial results; all her complaints vanished. Sir James Wylie has given a remarkable instance of the influence of light. He states that the cases of disease on the dark side of an extensive barracks at St. Petersburgh, have been uniformly, for many years, in the proportion of three to one to those on the side exposed to strong light. The experiments of Dr. Edwards are conclusive. He has shewn that if tadpoles are nourished with proper food, and exposed to the constantly renewed contact of water (so that their beneficial respiration may be maintained), but are entirely deprived of light, their growth continues, but their metamorphosis into the condition of air-breathing animals is arrested, and they remain in the form of large tadpoles. Dr. Edwards also observes, that persons who live in caves and cellars, or in very dark and narrow streets, are apt to produce deformed children; and that men who work in mines are liable to disease and deformity beyond what the simple closeness of the air would be likely to produce."

(*To be continued.*)

THE ART OF BRICKMAKING.

(*Continued from page* 529.)

Within the period of the wars of Edward I. and II., wall-tiles, which before were made of uncertain dimensions, were then made after the Flemish manner, and often used in building walls. The lower part of these walls, about 2 feet above ground, were generally made of rag-stones, laid in the common manner; but their upper parts were faced with brick on the outside, and on the inside with soft stone, clunch, or any materials the country afforded; others were faced with brick on each side, half a brick thick, and the space between was filled with rough stones and mortar. About this time it was customary to chequer the fronts of brick and stone buildings with black dints. In 1530 Hans Holbein built a gate opposite the Banquetting-house, Whitehall, in this manner, and ornamented the fronts with busts in circular recesses, with mouldings round them of baked clay in proper colours, and glazed in the manner of delf ware. The brick buildings of this age may be distinguished by being chequered with glazed bricks of a colour darker than the rest of the face-work, which was generally of bricks of a deep red, hard and tolerably well burnt. In the reign of Charles I. brick buildings were well executed under the direction of Inigo Jones. The rate of wages of bricklayers in 1610 set down and assessed at Okeham, Rutlandshire, was, for a bricklayer from Easter to Michaelmas, 5d. per diem, with meat, or 9d. without; after Michaelmas, 4d. with meat, and 8d. without: a bricklayer's apprentice, before Michaelmas, 3d. with meat, and 7d. without; after Michaelmas, 2d. with meat, and 6d. without: a tiler or slater earned from 4d. to 5d. with meat, and from 8d. to 10d. without.

In the present century the art of brickmaking is very little attended to for the common buildings of London and other large cities. Houses in the neighbourhood of London are seldom reared with a view to durability; raised on speculation, and let on lease for a certain term of years, which seldom exceeds 99 years, it is supposed to be the interest of the builder to construct a house so that it shall last the term of the lease, or, as is oftener the case, it is built for sale, without any reference to its durability. Again, in this brick-building age, competition leads to furnishing bricks at as cheap a rate as possible, without the least reference to their durable qualities. The evils of the system prevail over the advantages of occasionally rebuilding at the same cheap rate, for they very often entail upon the householder so large and continuous an outlay as to render the property all but valueless and unmarketable. Since the extensive introduction of stucco these ephemeral structures have become more abundant.

The best material for making bricks is undoubtedly *loam*, a term usually applied to a natural mixture of sand and clay, this is a yellowish, or reddish-coloured, fatty earth, and generally produces a red brick, much harder and compacter than any other kinds of common brick. Marl, which is a natural mixture of chalk or lime and clay in variable proportions, is perhaps the next best material for common bricks, but the less lime it contains the more suitable it is to the brickmaker, for a mixture of silica, lime, and alumina, is very fusible, and consequently bricks when burned, if great care be not taken, are apt to melt and run into each other.

It is presumed that the best mixture for making common bricks is three parts of clay and one part of limestone or chalk in powder; but previous to this mixture being used, it ought to be first ascertained what the nature of the clay is, for under this general term we find an endless variety in composition and character. Where durability is the object, excess of silica is undoubtedly advantageous, as being better calculated to resist atmospheric action, less absorbent, and giving greater density; alumina ought to be less abundant than in potter's clay, for aluminous earths, however dense their structure after burning, have great absorbing powers, and consequently are sensibly affected by a moist, cold climate; lime is also a powerful absorbent, and should the chief constituents be alumina and lime or chalk, it is very questionable, even when aided by incipient fusion, whether it form a durable brick. All clays contain silica in various proportions, which, with alumina, form the bases and chief ingredients of these earths; all contain some portion of lime, which being neutralized by mixture with the other earths, will not effervesce with acids; the latter, when the clay beds are from natural causes deprived of their moisture, very often separates from the other mixtures, and is found intersecting undurated clay in veins and net-like tracery. In burning it acts as a flux to the former, it is therefore an essential ingredient when partial vitrification is required. Bergman examined several clays made in the neighbourhood of Upsal, and made bricks, which he baked with various degrees of heat, suffered them to cool, immersed them in water for a considerable time, and then exposed them to the open air for three years. They were formed of clay and sand. The hardest were those into the composition of which a fourth part of sand had entered. Those which had been exposed to the fire for the shortest time, were almost totally destroyed, and crumbled down by the action of the air; such as had been thoroughly burned had suffered less damage, and in those which had been formed of clay alone, and were half vitrified by the heat, no change whatever was produced. Here then we have decisive evidence that silica should be in excess, as tending to produce that glassy appearance or semi-vitrification so essential to its durability, and this was the kind of bricks so much used in chequer-work, as noticed above. Where the vitreous crust may be deemed necessary, Bergman recommends the projection of a due quantity of salt into the furnace, which would produce the effect in the same manner as is seen in the fabrication of stone-ware.

It is of considerable importance to examine clay previous to working it up in bricks, which Bergman advises may be done as follows:—Nitrous acid poured upon unburned clay detects the presence of lime by producing an effervescence. In the next place a lump of clay of a given weight is to be diffused in water by agitation. The sand will subside, and the clay will remain suspended. Other washings of the residue will carry off some clay, and, by due management in this way, the sand or quartzose matter may be had separate. Nitrous acid by digestion will take up the lime from a part of the clay previously weighed, and this may be precipitated by volatile alkali. The clay, the sand, and the lime, may thus be well enough ascertained by weight, so as to indicate the quantity of sand or other material requisite to be added, in order to form that compound, which, from other experiments, may have been found best adapted to produce good tiles and bricks.

In Dr. Percival's Essays we have the following experiment of the effects of brick on water: two or three pieces of common brick were steeped four days in a basin-full of distilled water; the water was then decanted off and examined by various chemical tests. It was immiscible with soap, struck a lively green with syrup of violets, was rendered slightly lactescent by the volatile alkali, and quite milky by the fixed alkali and a solution of saccharine saturni. "This experiment," he observes, "affords a striking proof of the impropriety of lining wells with bricks, which cannot fail of rendering the water hard and unwholesome."

As a preliminary to the manufacturing process, the clay should be dug up in autumn, spread over as large a surface as possible, and in this state lie during the whole of the winter exposed to the frost; in this state it greedily absorbs atmospheric air, which, penetrating and dividing the particles of the earth, facilitates the subsequent operations of mixing and tempering. During this time the earth should be repeatedly turned and worked with the spade. In the spring the clay is broken in pieces and thrown into shallow pits, where it is watered and suffered to remain soaking for several days; it is then tempered, and upon the due performance of this process depends in a great measure the quality of the brick, for unless the several ingredients be intimately united, we cannot hope for an uniform material. So important is this part of the process, that it has been recommended to dry and pulverize the clay, and then mix; but this process would involve large additional expense. By well beating the clay, M. Gallow succeeded in making a brick of much greater strength and density. On placing one of these bricks with the centre on a sharp edge, and loading the two ends, the bricks formed with the well-tempered earth were broken with a weight at each end of 65 lb., or 130 lb. in all, while others were broken with 35 lb. at each end, or 70 lb. in the whole.

Fire-bricks made from Stourbridge clay mixed with a quantity of old fire-bricks, or crucibles, or glass pots, reduced previously to powder, contain an excess of silica over alumina.

ARGIL.

TIMBER—ITS TREATMENT AND USES.

BY JAMES WYLSON.

(*Continued from p.* 583.)

151. *The Grindstone Oak* in the Holt, mentioned by White of Selborne, which has been deemed the largest in this island, measured at 5 feet from the ground full 36 feet in circumference; it was computed to contain in 14 feet of length, 1,000 feet of timber. *The Buck's Horn Oak*, another great tree in the same place, is stated to be not yet entirely dead.

152. *Goff's Oak* stands on Cheshunt-common, about five miles beyond Enfield, through Bull's Cross, and about the same distance from the railroad station at Waltham. The tradition is that it was planted in 1066 by Sir Thomas Godfrey or Goff, who came over with William the Conqueror. The girth is 20 feet at 3 feet from the ground; the trunk is hollow, and several persons can stand in the cavity.

153. *The Golynos Oak* stood about four miles from Newport, Monmouthshire. When